

## Morning glory: A new thirst in-search of de-novo therapeutic approach

Ashish Manigaunha<sup>1\*</sup>, N Ganesh<sup>2</sup> and M D Kharya<sup>3</sup>

### \*Corresponding author:

Ashish Manigaunha  
<sup>1</sup>NRI Institute of Pharmacy,  
Sajjan Singh Nagar, Raisen  
Road, Bhopal, India

<sup>2</sup>Deptt of Research,  
Jawaharlal Nehru Cancer  
Hospital & Research Center,  
Bhopal, India

<sup>3</sup>Deptt of Pharmaceutical  
Sciences, Dr. H S Gaur  
University Sagar, India

### Abstract

*Ipomoea pes-caprae* (Convolvulacea) is a valuable medicinal plant, distributed in the tropics and subtropics regions and uses in folk and tribal medicines. Usually known as dopatilata, railroad vine and goat's-foot morning glory. The plant contains active component likes naphthalenone, (-)-mellein, eugenol, 4-vinyl-guaiacol. lipophilic glycosides, 2-methylpropanoic, (2S)-methylbutyric, n-hexanoic, n-decanoic, and n-dodecanoic acids. The juice from the succulent leaves has been used as a first aid to treat jellyfish stings and also used in ritual baths to alleviate evil spells. The extract of the leaves have the astringent, diuretic and laxative properties. Leaves are used in rheumatism, and as stomachic and tonic. It has wide range of pharmacological activities like antioxidant, analgesic, anti-inflammatory, antispasmodic, antinociceptive, antihistaminic, insulogenic and hypoglycemic activities. This review focuses the published scientific evidence on its pharmacological properties, phytochemical composition, uses, along with descriptions of the plant. A number of herbal preparations are widely used in traditional system of medicine for the management of different disorders but, many of them have not been investigated for their described effects. This plant have broad spectrum activities so, further studies on other models and extensive clinical trials are needed to confirm these findings.

**Keywords:** Dopatilata; Bio-active compounds; Railroad vine; Clinical trails

### Introduction

Herbalism is a traditional medicinal or folk medicine practice based on the use of plants and plant extracts. It is also known as botanical medicine, herbal medicine and phytotherapy. It has been estimated that less than 10% of the large diversity of 250000-500000 plants species on the earth have been studied chemically and pharmacologically for their medicinal properties.[1, 2] In India, from ancient times; medicinal plants have been used to cure various ailments and 50% of the prescription of various

countries in Europe and US are natural products or there derivatives. [3, 4] Examples of successful medicines derived from natural product include most antibiotics, ACE inhibitors, many anticancer agents, immunosuppressant, and cyclosporine etc. [5]

Large numbers of plants are used in the world for the treatment of several ailments. The genus *Ipomoea* consist of more than 200 species widely distributed in tropical and subtropical countries. *Ipomoea pes-caprae* (Convolvulacea) plant is

highly reputed in folk and tribal medicines. Known by different names like Railroad vine, coast morning glory, goat's-foot morning glory, salsa-da-praia etc, grows on sand dunes and beaches above the high tide line in tropical and subtropical regions throughout the world.

### Synonym

English: Goat's foot creeper, Hindi: Dopatilata, Malayalam: Adambuvalli, Adamb, Sanskrit: Maryadavalli, Sagaramekhala

### Description

*Ipomoea pes-caprae* (L.) R. Br.-bayhops is a pan tropical, trailing vine that routinely colonizes on sand dunes. It grows just above the high tide line along coastal beaches, forming large mats that assist in stabilizing sands. This is an evergreen perennial with a large, thick root that can be 10 ft long and 2 inch in diameter. The entire plant is glabrous and somewhat fleshy. The stem runs along the ground rooting at the nodes with only the flowers being erect.[6-10]

**Leaves:** Leaves are thick, smooth and alternate reaching 10cm in length. Each leaf is rounded and without teeth but is usually folded on the mid-vein and may be notched at the apex. The leathery heart-shaped leaves have a cleft at the tip and are shaped like a goat's footprint. Branches have milk-colored latex in the sap, while leaves and branches produce indole alkaloid ergotamine that protects the plant from most insects and grazing mammals.

**Flowers:** Auxiliary funnel shaped flowers are showy; pink to lavender purple about 2 inches long. Each flower opens only once, in the morning, but they keep coming almost all year long, peaking from May through November. Corollas are 3 – 6 cm in length and are funnel shaped.

**Stems:** Stems are numerous, prostrate, glabrous, rarely twining, tough and flexible, 1.3 cm in diameter, there branches freely and roots develop at the nodes.



**Figure 1.** *Ipomoea pes-caprae*

**Roots:** Starchy root have an irritant taste, fibrous texture and a thick brown bark.

**Seed:** Its seeds formed inside capsules can tolerate salt water.

**Habitat:** *Ipomoea pes-caprae* is one of the most widely distributed beach plants throughout tropical and subtropical areas in the world. It occurs along the beaches, coastal strands and tropical islands of tropical North and South America, east central Africa, west central Africa, India, Asia, and Australia. Plants creep over sand dunes, setting down adventitious roots, and eventually form large mats that prevent erosion. *Ipomoea pes-caprae* probably competes for space and light with other coastal species of plants. Devall (1992) suggested that in Florida, when *Ipomoea pes-caprae* competes with *Ipomoea stolonifera*, that *Ipomoea pes-caprae* is most commonly on the more unstable substratum.

### Phytochemical profile of *Ipomoea pes-caprae*

*Ipomoea pes-caprae* yields 2-hydroxy-4, 4, 7-trimethyl-1(4H)-naphthalenone, (-)-mellein, eugenol, and 4-vinyl-guaiacol. Through preparative-scale recycling HPLC, yielded six lipophilic glycosides, namely, five new pentasaccharides of jalapinic acid, pescaproside A (1) and pescapreins I-IV (2-5), as well as the known stoloniferin III (6). Saponification of the crude resin glycoside mixture yielded simonic

acid B (7) as the glycosidic acid component, whereas the esterifying residues of the natural oligosaccharides comprised five fatty acids: 2-methylpropanoic, (2S)-methylbutyric, n-hexanoic, n-decanoic, and n-dodecanoic acids. [11]

### Biological activities and uses

Traditionally *Ipomoea pes-caprae* is used in different ways like; the juice from the succulent leaves has been used as a first aid to treat jellyfish stings. Some Indians use it in ritual baths to alleviate evil spells. Leaves are used in rheumatism, and as stomachic and tonic. The extract of the leaves have the astringent, diuretic and laxative properties. It has biological activity like antioxidant, analgesic and anti-inflammatory, antispasmodic, anticancer, antinociceptive, antihistaminic, insulogenic and hypoglycemic. [13] It is also used in inhibition of platelet aggregation, diarrhoea, vomiting, and piles[12].

### Pharmacological profile

**Anti-Inflammatory activity:** Leaves extract *Ipomoea pes-caprae* is used as a traditional remedy to cure inflammation, which has been proved on experimental models. Topical application of the extract inhibited carrageenan-induced paw oedema and ear oedema induced in rats by arachidonic acid or ethyl phenyl propiolate. [14]

**Antinociceptive activity:** Methanolic extract from *Ipomoea pes-caprae* exhibit a good antinociceptive property due to the presences of compounds, such as glochidone, betulinic acid, alpha- and beta-amyrin acetate, isoquercitrin in the writhing test and formalin test in mice. These findings support, at least in part, the popular use of *Ipomoea pes-caprae* to treat dolorous processes. [15]

**Antioxidant activity:** *Ipomoea pes-caprae* has the potential in scavenging free radicals and can be a vital source of antioxidant phytochemicals. [16]

**Antispasmodic activity:** Crude plant extract of the plant *Ipomoea pes-caprae* has been shown to antagonize smooth muscle contractions induced

by several agonists via a non-specific mechanism. Bioassay-guided fractionation of *Ipomoea pes-caprae* resulted in isolation of the antispasmodically acting isoprenoids beta-damascenone and E-phytol. Their antispasmodic potencies were found to be in the same range as that of papaverine, a general spasmolytic agent. This effect was suggested to play a role in the previously observed anti-inflammatory activity of IPA by interfering with the contraction of endothelial cells. [17]

### Miscellaneous activity

Neutralization of toxic effects of crude jellyfish venoms by an extract of *Ipomoea pes-caprae* previously shown to be clinically effective toward dermatitis caused by venomous jellyfishes was studied as to its ability to neutralize toxic activities of jellyfish venoms. These activities of *Ipomoea pes-caprae* support the previously reported effectiveness in the treatment of dermatitis caused by jellyfish sting. [18]

As per Pongprayoon *et al.* (1992) compounds from *Ipomoea pes-caprae* has previously been shown to reduce the development of rat ear oedema induced by ethyl phenyl propiolate (EPP) in a dose-dependent manner. Using this bioassay to guide fractionation of the extract, two diastereomeric compounds, the actinidols 1a and 1b were isolated. The actinidols constitute part of the active principle of *Ipomoea pes-caprae*. Compounds, previously isolated from *Ipomoea pes-caprae*, with either prostaglandin synthesis inhibiting activity in vitro [2-hydroxy-4, 4, 7-trimethyl-1(4H)-naphthalenone, (-)-mellein and eugenol] or antispasmodic activity (E-phytol) were also assayed for inhibitory effects on the development of EPP-induced rat ear oedema. [19] Pongprayoon *et al.* (1989) showed that inhibitory effect of extract of *Ipomoea pes-caprae* on guinea-pig ileal smooth muscle. Extract of *Ipomoea pes-caprae* used in Thailand as a folk remedy for treating dermatitis caused by jellyfish and Portuguese man-of-war, when tested for antagonistic activity against histamine, acetylcholine, bradykinin and barium chloride on the isolated guinea-pig ileum, the extract

reversibly inhibited the contraction induced by all the spasmogens in a concentration-dependent manner and decreased both the slope and the maximal response of the concentration response curves. As per the author it is not likely that the extract specifically interferes at the receptor level. It may be due to the direct action of the extract on the ileal smooth muscle. [20]

## Conclusion

*Ipomoea pes-caprae* has broad spectrum of pharmacological activity. As relatively a little work has been done on it, through research work is needed to be done on this potential plant which may yield many bio-active compound.

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